

Digital Library Interoperability

technical, semantic and object modelling aspects

as identified in the course of building

The European Digital Library

Dr. Stefan Gradmann
Universität Hamburg / Regionales Rechenzentrum
stefan.gradmann@rrz.uni-hamburg.de
www.rrz.uni-hamburg.de/RRZ/S.Gradmann

- Interoperability **framework** from EC working group and ongoing work within EDLnet
 - Working Group and EDLnet WP2 **context, methodology** and selected **interoperability frameworks**
 - **10 DL Interoperability Short Term Agenda Issues**
 - Long Term **Strategy Elements**
 - Evolution of **Object Models** (with a short glances at architecture)
- What's in a name?
- Concluding message ...

EDL Context + Mission

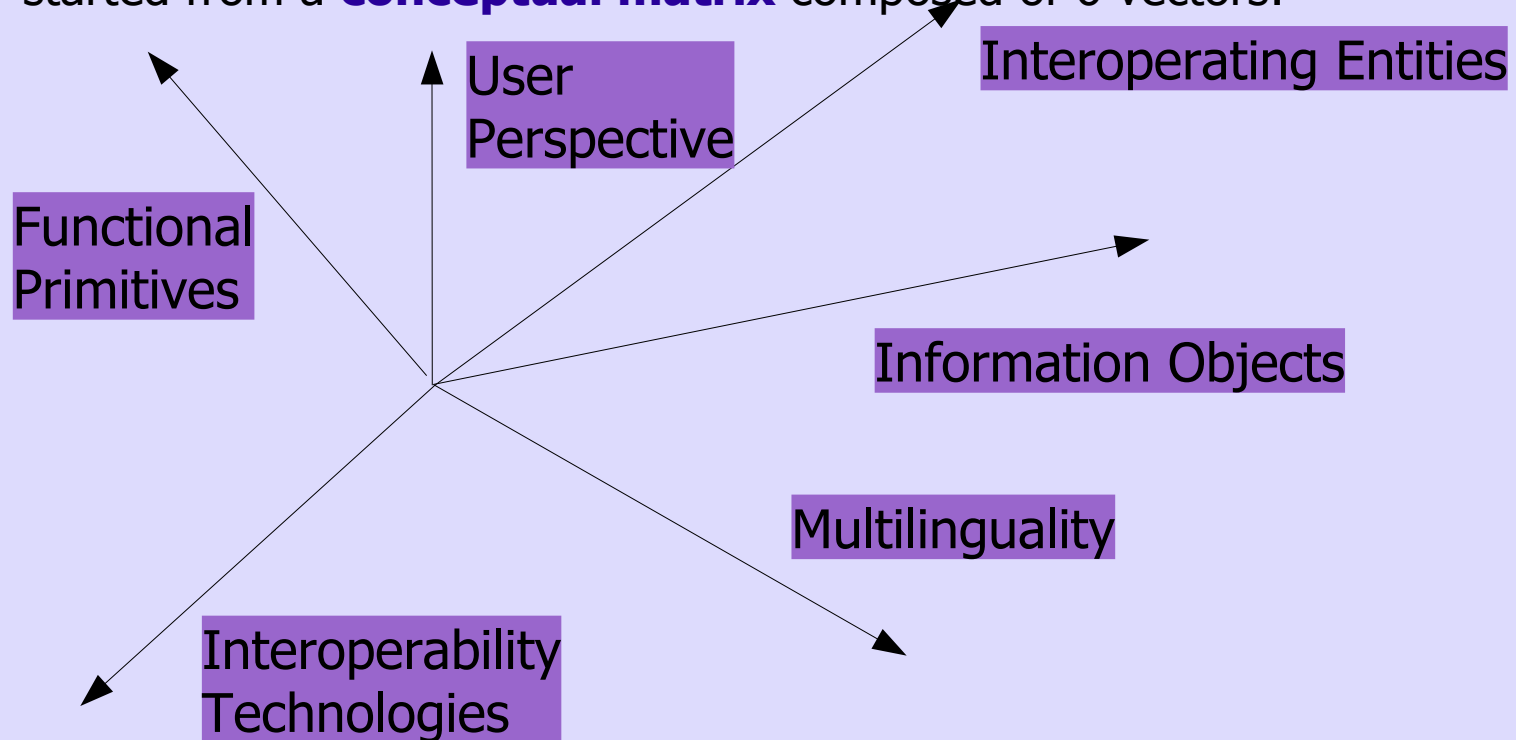
- EC i2010 agenda with Digital Libraries as one of 3 'flagship initiatives': the setting up of the **European Digital Library** as a common multilingual access point to Europe's distributed digital cultural heritage including all types of cultural heritage institutions
 - **2008**: \geq 2 million digital objects; multilingual; searchable and usable; work towards including archives.
 - **2010**: \geq 6 million digital objects; including also museums and private initiatives.
 - "I am **not** suggesting that the Commission creates a single library. I envisage a **network** of many digital libraries – in different institutions, across Europe." V. Reding (29 September 2005)
- EC WG active from January to June 2007 with a double mission:
 - Contribute to the **short term DL agenda** \Rightarrow identify areas for short term action (**list of prioritised feasible options**)
 - Contribute to the **long term DL agenda** \Rightarrow identify key elements for a **long term strategy**
- **Personal and thematic continuity** within EDLnet WP2

Original Working Group Composition

- Emmanuelle **Bermes** (Bibliothèque nationale de France / F),
- Mathieu **Le Brun** (Centre Virtuel de la Connaissance sur l'Europe / LU)
- Sally **Chambers** (The European Library Office / TEL),
- Robina **Clayphan** (The British Library / GB),
- Birte **Christensen-Dalsgaard** (State and University Library Aarhus / DK),
- David **Dawson** (The Museums, Libraries and Archives Council / GB),
- Stefan **Gradmann** (Hamburg University Computing Center / D),
- Stefanos **Kollias** (Technical University of Athens / GR),
- Maria Luisa **Sanchez** (Ministerio de Cultura / ES),
- Guus **Schreiber** (Vrije Universiteit Amsterdam / NL),
- Olivier **de Solan** (Direction des Archives de France / F)
- Theo **van Veen** (Koninklijke Bibliotheek / NL)
- *EC: Pat **Manson** Chair), Marius **Snyders** (European Commission, DG INFSO, Cultural Heritage and Technology Enhanced Learning) Federico **Milani** (European Commission, DG INFSO, eContentPlus)*

Conceptual Framework of Interoperability WG

- "Interoperability is the capability to **communicate, execute programs, or transfer data** among various **functional units** in a manner that requires **minimal knowledge** of the **unique characteristics** of those units."
- To identify more precisely the determining factors of interoperability we started from a **conceptual matrix** composed of 6 vectors:



Vector Details 1

■ Objects of Inter-Operation

- **entire** digital information objects (analogue vs. born digital) vs. **representations** (metadata sets) vs. **surrogates** vs. **functions** vs. **services**

■ Functional Perspective of Interoperation

- **Exchange** vs. **propagation** of digital content (OA/Non OA)
- **Aggregation** of objects into a common content layer (push vs. harvesting / pull)
- **Portal based interaction** with multiple Digital Libraries

■ Interoperating Entities

- **Cultural Heritage Institutions** (libraries, museums, archives) vs. **Digital Libraries** vs. **Repositories** (institutional and other) vs. **eScience/eLearning platforms** or simply '**services**'

■ Multilinguality

- Multilingual / localised **interfaces**,
- Multilingual **Object Space** (dynamic query translation, dynamic translation of metadata or dynamic localisation of digital content)

■ Design and Use Perspective

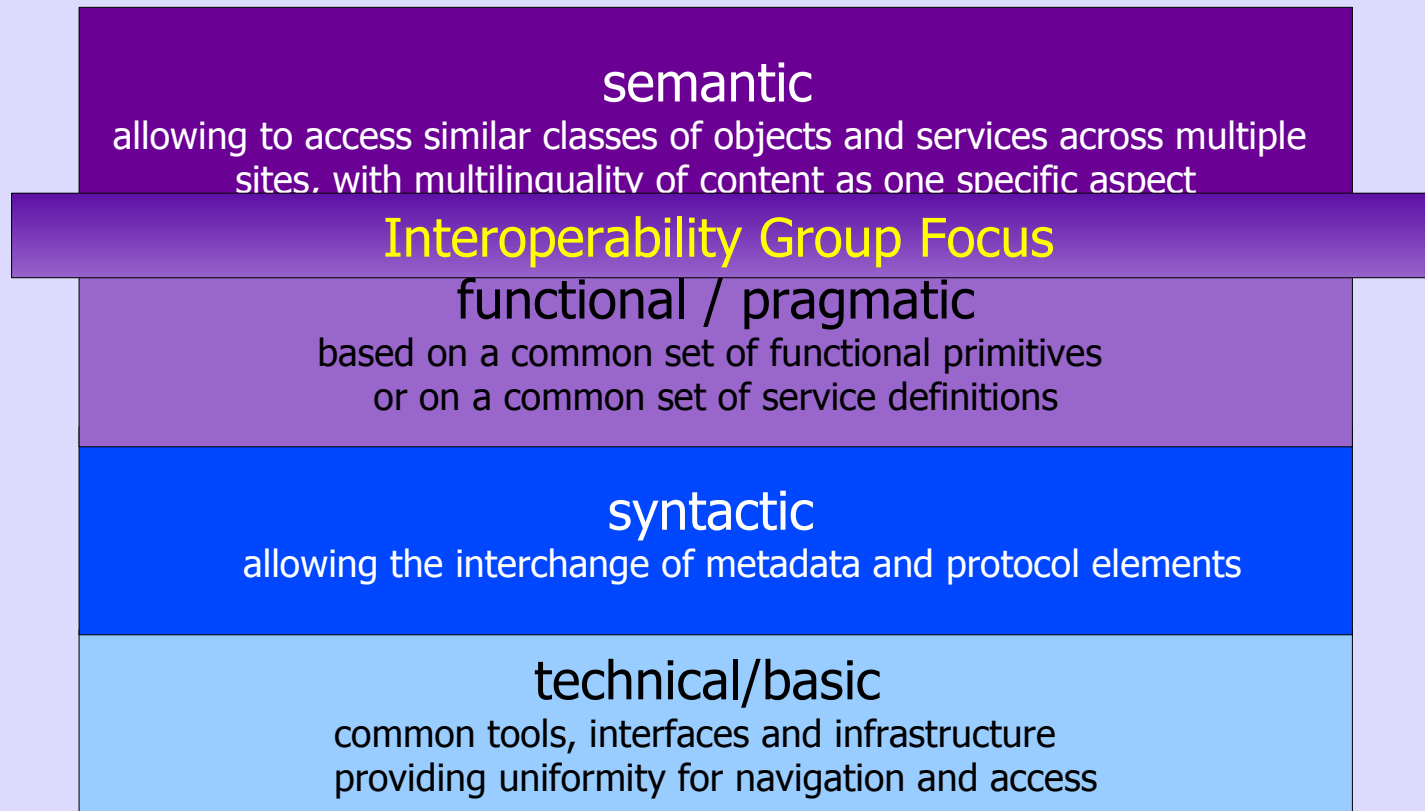
- **Manager** vs. **administrator** vs. **consuming end user** vs. **content providing end user** vs. **content aggregator** vs. **meta user** vs. **policy maker** ...

■ Interoperability Enabling Technology

- Z39.50 / SRU+SRW
- harvesting methods based on OAI-PMH
- web service based approaches (SOAP/UDDI)
- Java based API defined in JCR (JSR 170/283)

Interoperability Abstraction Levels

Abstract



Concrete

Interoperability Frameworks Considered

- Deliberately discarded a lot of these, such as DAREnet, aDORe. CORDRA / IMS DRI (CP and ECL), e-Framework, O.K.I. Open Service Interface Definitions (OSIDs), and more ...
- Had a closer look at:
 - **5S** framework
 - **JISC Information Environment** (SOA)
- And (for the time being) took over a lot from
 - *Object Reuse and Exchange* (**OAI-ORE**)
 - **JCR** (*Java API*)
 - **DRIVER** *repository federating architecture*
 - **DELOS** *framework for Digital Libraries (cf. infra)*

Short Term Agenda Issues for 2008

- **(1) User Requirements** => EDLnet WP3
- **(2) Object Models (granularity and structure)** => EDLnet WG2.2
 - Can we inter-operate at levels of granularity and complexity of the digital information objects beyond that of **complete objects**?
 - And which **packaging standards** such as METS, MPEG 21 (DIDL) or XFDU, do we need as “wrappers” for complex objects?
- **(3) Persistent Identifiers** => EDLnet WG2.1 and WG 2.2
 It should be **technically impossible to create new resources in EDL without applying standard identifiers**
- **(4) Metadata** => EDLnet WG 2.1
 - Use of **semantic interoperability techniques** for **semantic mappings** and the cross-searching of descriptive metadata **instead of** a higher level interoperability application profile.
 - Domain-specific **Dublin Core Application Profiles** ...
 - Provision for **rights** and **technical metadata** ...
 - Need of a **metadata registry** ...

Short Term Agenda Issues for 2008 / 2

- **(5) Service Description Framework for Service Registry**
The idea of a [service registry](#) hasn't yet been taken up in EDLnet again
- **(6) Licensing Policies** => EDLnet WG 2.2
Mandatory licence declaration in surrogate 'root' component
- **(7) Authentication Data Exchange** => EDLnet WG 2.3
[SAML-based methods](#) for federating trusted sites
- **(8) Basic Semantic Interoperability** => EDLnet WG 2.2
Use SKOS, OWL and RDF to make existing [controlled terminology](#) machine understandable to create a data layer ready for semantic query methods.
- **(9) Awareness Building regarding Semantic Interoperability**
Demonstrate the value added by (8) in order to establish and market semantic interoperability functions of EuDL as [our unique selling point](#).
- **(10) Interoperation of EUDL and WWW services (Google etc.)**
EDL architecture to allow the creation of [maximum exposure](#) of services and content in generic WWW services making sure the [EuDL provenance is clearly identifiable](#) => 'Landing Page' in EDLnet WG 2.2

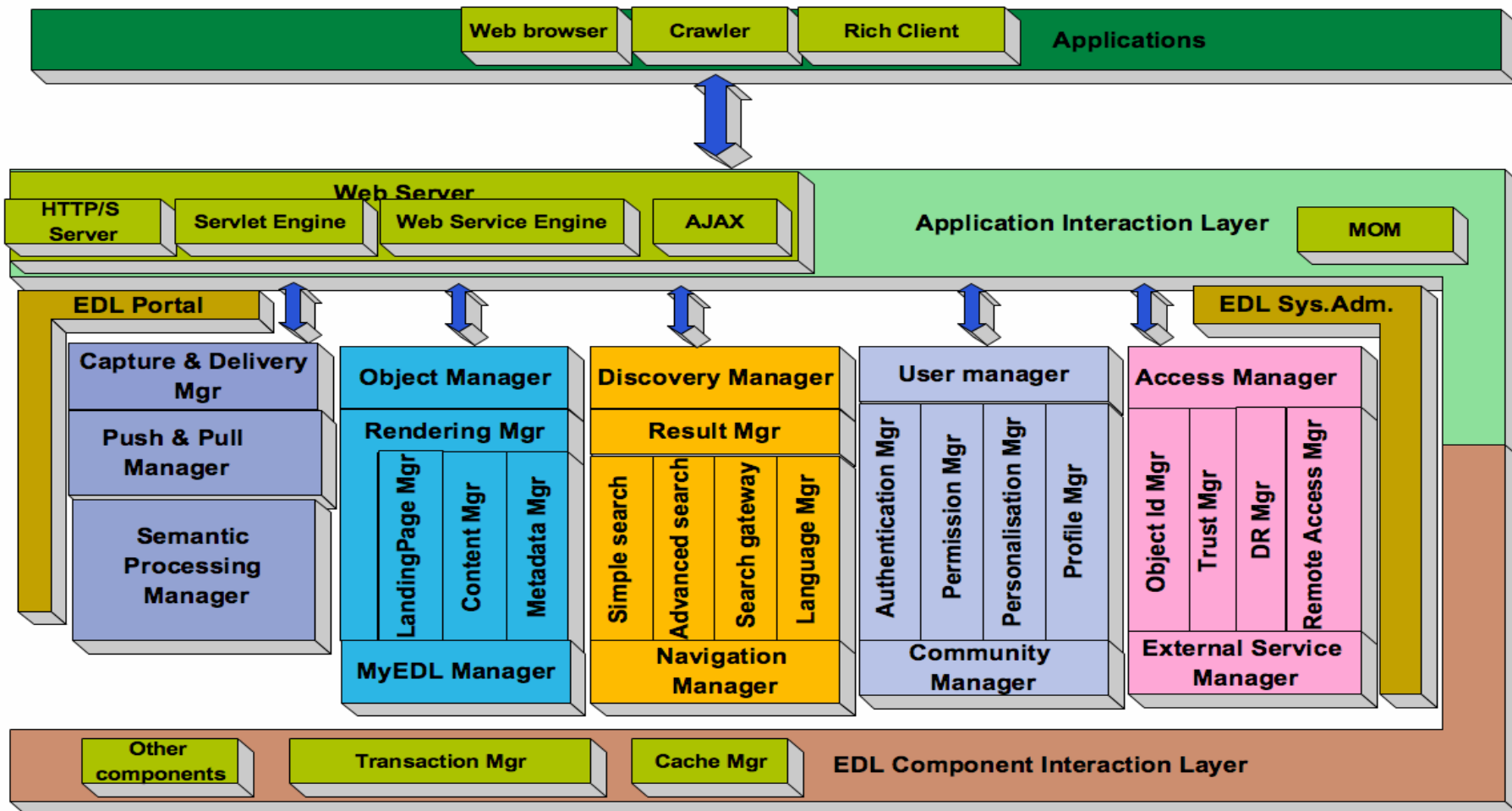
Long Term Agenda Issues (2008 => 2010 and beyond)

- **Object Modelling** (increase in Granularity and Complexity)
- **Authorisation** (role models and role semantics),
- **Usage Logging, Accounting, Payment**
- **Legal and Access Protection** Issues (IPR / Rights / DRM)
- **Advanced Semantic Interoperability** (**Concepts / Ontologies / Rules / Reasoning**) and mapping to object modelling standards
- **Name Authority** Services
- **Multilingualism of Content**
- **Identification of Functional Primitives**
- **Service description** as a basis for service integration
- **Technical and Economical Sustainability**
- Strategic goal of EuDL: to act rather as a **service provider** or as a **data/object provider**?
- More details on EC Working Group at <http://bnd.bn.pt/seminario-conhecer-preservar/doc/Stefan%20Gradmann.pdf>

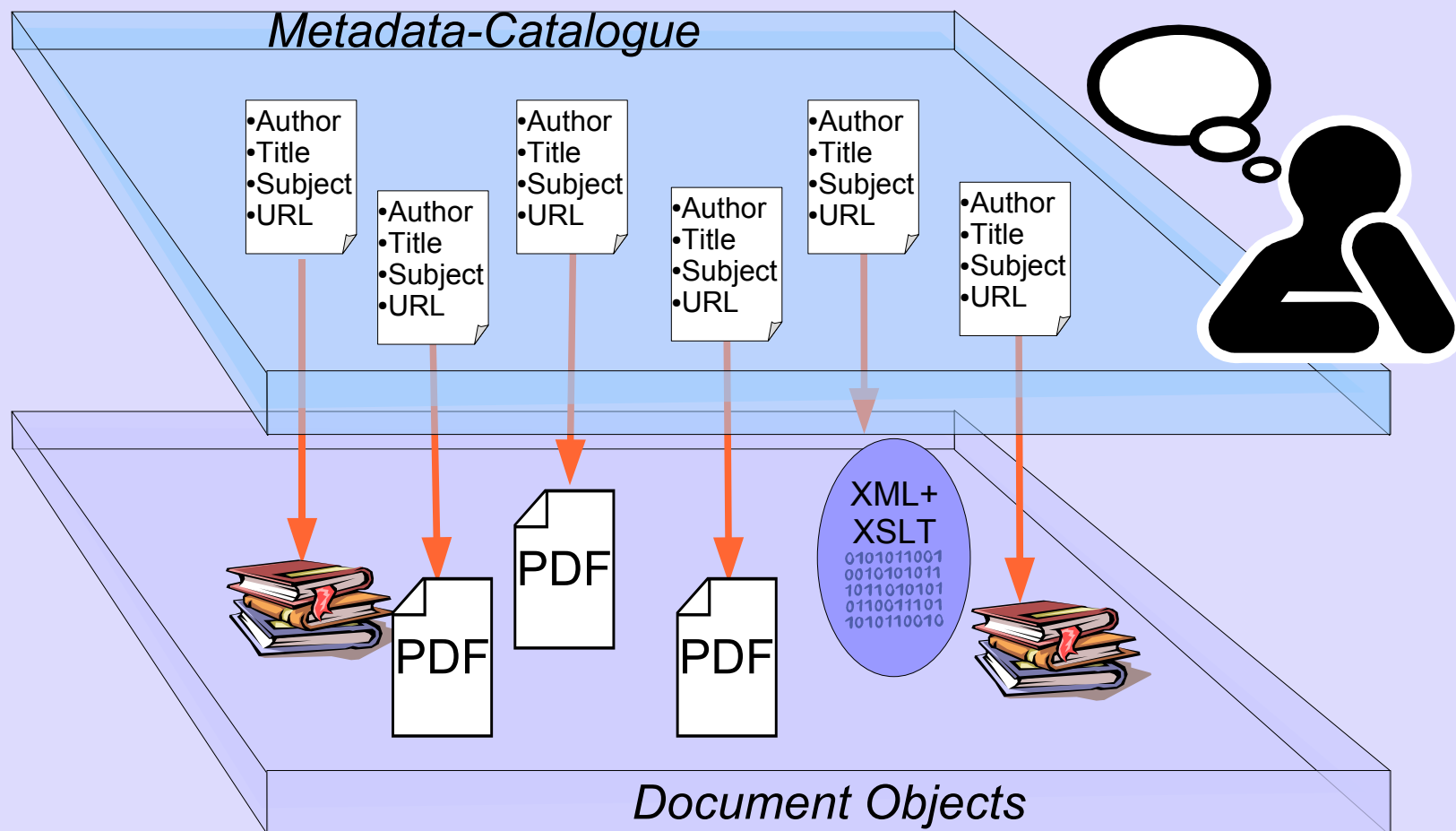
From EC Working Group to EDLnet

- Both Short Term and Long Term Agenda Issues are input for EDLnet and the WP2 Working Groups and thus fed into the process of building the **European Digital Library**:
 - WG 2.1 Standards & Interoperability (Makx Dekkers)
 - WG 2.2 Semantic and Linguistic interoperability (Stefan Gradmann)
 - WG 2.3 Technical Interoperability (Carlo Meghini)
- Most EC WG members are participating in the EDLnet WGs
- EDLnet is to deliver
 - Functional and technical vision for the European Digital Library ('maquette')
 - First public prototype of European Digital Library for presentation by the Commissioner in November 2008
 - Functional and technical specifications for operational EDL

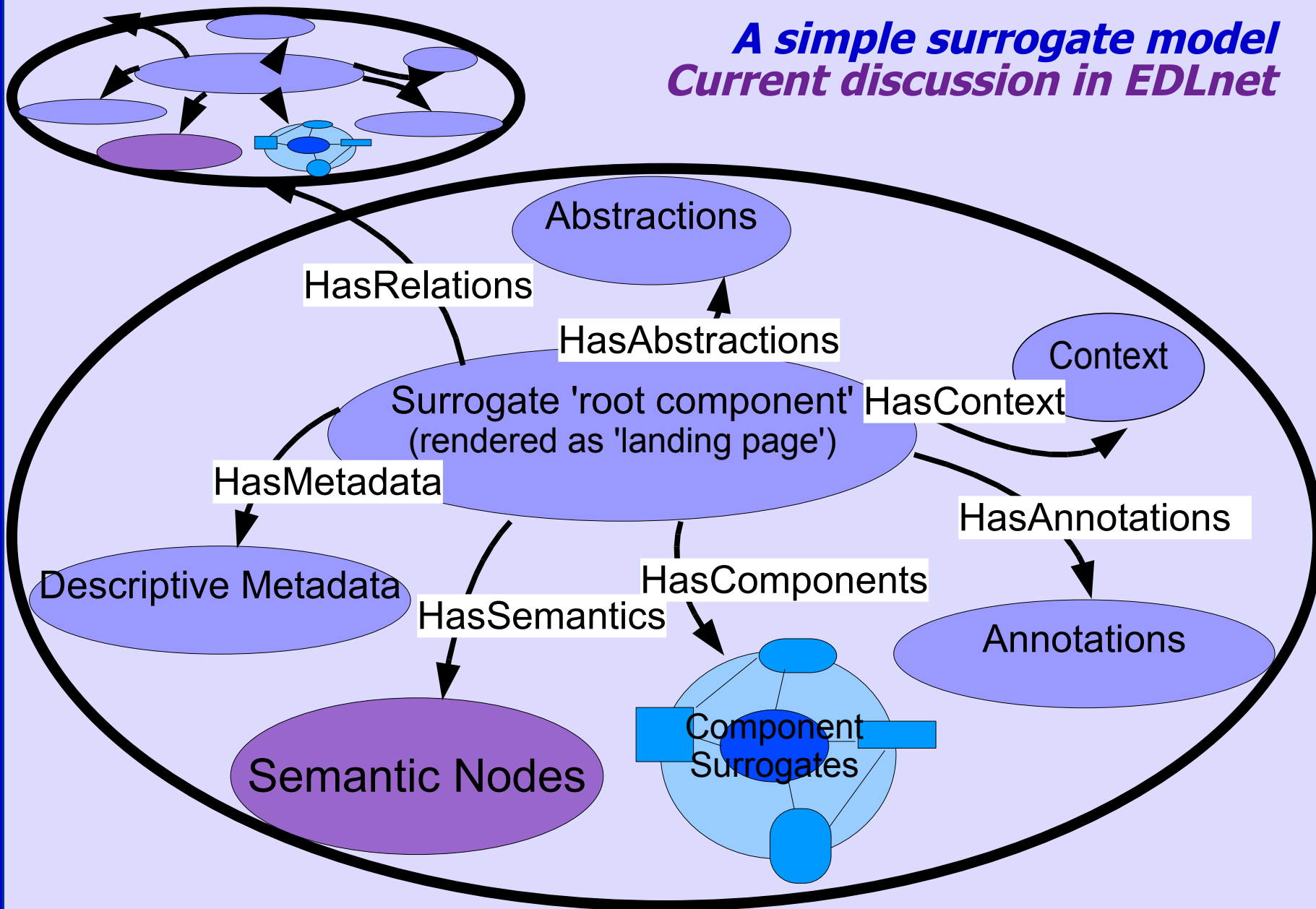
EDLnet: ongoing work ...



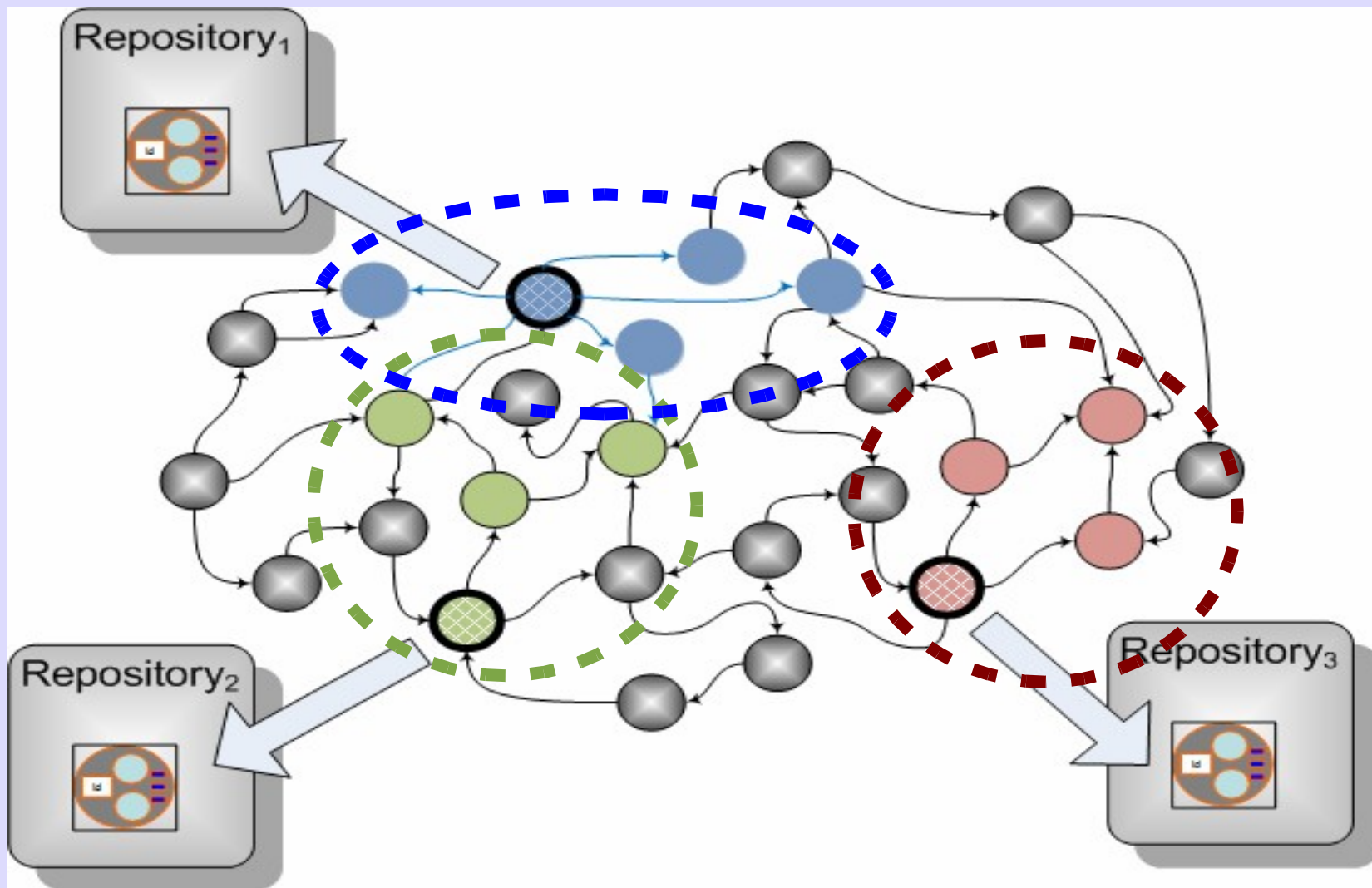
Metadata and Objects In (digital) library catalogues



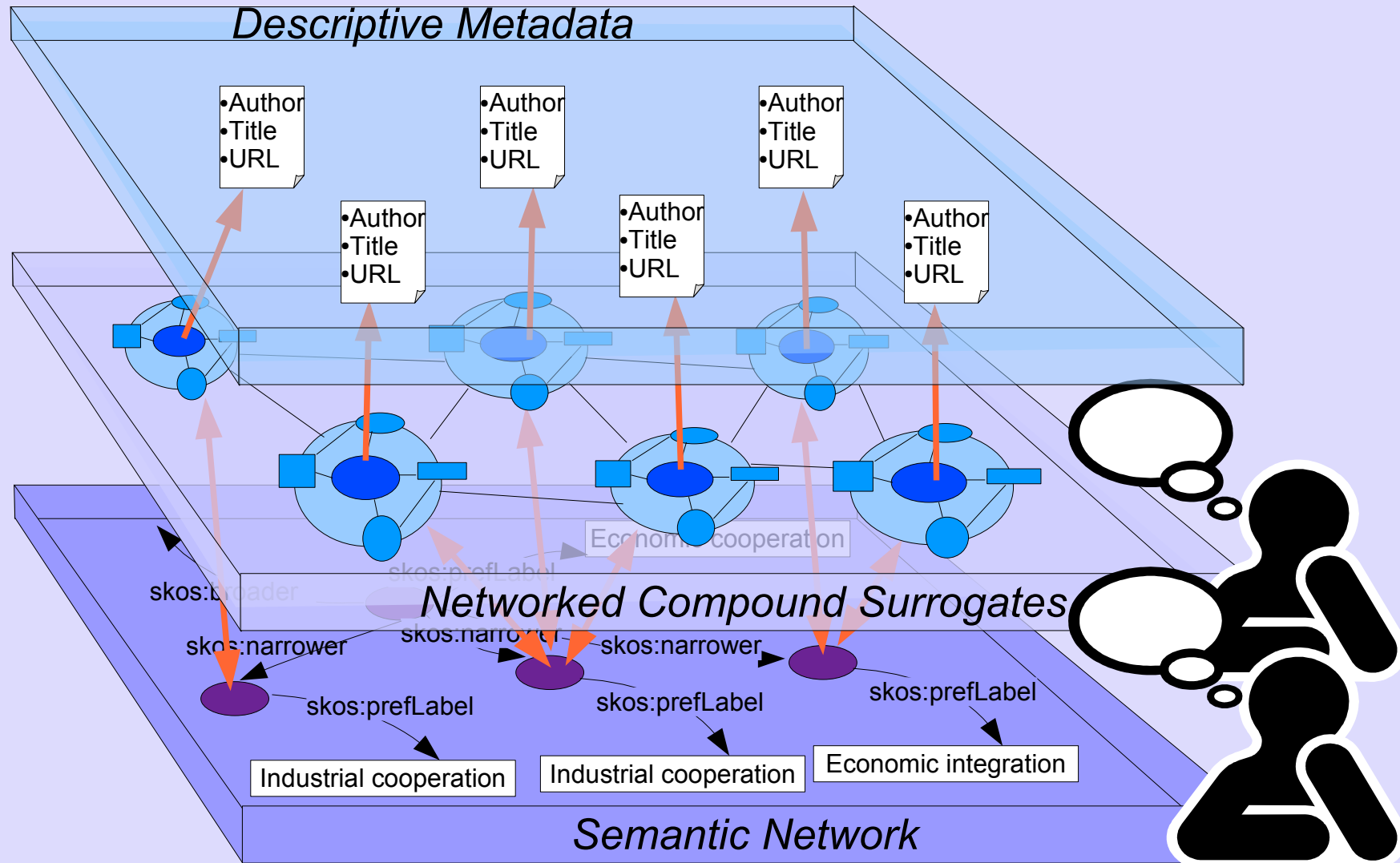
A simple surrogate model Current discussion in EDLnet



A complementary and more granular model Object Reuse and Exchange (ORE)



Document Objects, Metadata and Semantic Networks as part of a network of inter-operating complex surrogates enabling object discovery and use



Roadmap towards the 'thing''

- Maquette: the vision
 - First draft of technical and functional specifications to be produced until 12/2007
 - Maquette building in 12/2007 and 01/2008
 - Presentation at EDLproject conference 1st of February 2008
- Prototype: the first partial set of functionality
 - Refinements of specifications for prototype development as a reaction to feedback of maquette in March/April 2008
 - Freezing point of prototype requirements by 04/2008 (?)
 - Prototype development from 02/2008 – 09/2008
 - Prototype testing in 09-10/2008
 - 11/2008: presentation of prototype by commissioner Reding

What's in a Name? And a concluding message ...'

- What's in a name?
 - European Digital Library is problematic, for several reasons ...
 - The 'thing' is NOT a library – we thus are not going to call it EDL!
 - Current favourite candidates are 'Europeana' and 'Eureka'
- And a concluding **thank YOU** (the DELOS community):
 - For (finally) delivering the Reference Model, which we thus can (finally) use ...
 - For (hopefully) continuing work on the reference architecture and eventually extending the RM work beyond single DL instances (interoperability shouldn't be restricted to the 'architecture' view!)
 - For contributing to building then 'thing', with very active DELOS community members such as Carlo Meghini or Carol Peters helping us in our work!
- And thank you for your patience and attention